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NCPE26032

Acceptable Sign Support Columns

8" Sch 40, 8.625" Dia, 0.322" wall, A53 Steel Pipe Column, S=15.46 M=27.1
8.625" Dia, 0.25" wall, A500 42ksi HSS Steel Column, S=12.5 M=26.3
6" L x 6" W x 0.375" wall, A500 46ksi HSS Steel Column, S=13.1 M=30.1
8" L x 8" W x 0.25" wall, A500 46ksi HSS Steel Column, S=17.7 M=40.7

North_Carolina, 2018 NORTH CAROLINA BUILDING CODE
2015 IBC with NC Amendments, ASCE 7-10

120	**Wind Speed, Vult,** mph, from	ASCE 7-10, Figure 26.5
II	**Risk Category;** II, Normal; III, Substantial Hazard; IV, Essential/Critical	
C	**Wind Exposure;** C, House size obstructions for 1200 ft; D no obstructions	

Sand (type 4) Presumptive soil type

WIND LOAD CALC: ASCE 7-10 Section 29.4.1, Solid Freestanding Signs
Terrain K_{zt}=1, no hill, ridge, or escarpment >15' high; Directionality K_d=0.85; Gust G=0.85 rigid structure;
K_z=2.01*(H/900)^(2/9.5)ExpC, (700&11.5)ExpD; $q_{h,ult}$=0.00256*K_z*K_{zt}*K_d*V^2_{ult}

A	B	C	D	E	F	Sign Segment ID	OAH&D
15.0	9.2	-0.03	-0.03	-0.03	-0.03	Segment Top Above Grade, Top, ft	15.0
10.0	3.0					Segment Width, W, ft	5.7
5.8	9.2					Segment Height, H, ft	15.0
58.30	27.51					Segment Area, ft², adjusted for grade height	
0.849	0.849	0.849	0.849	0.85	0.85	Velocity Pressure Exposure Coeff; K_z	
26.6	26.6	26.6	26.6	26.6	26.6	Velocity Pressure, $q_{h,ult}$, psf (per segment)	
1.80	1.65					Force Coefficient, C_f (per segment)	1.65
40.7	37.3					Wind Pressure, P_{ult}, psf = $q_{h,ult}$*G*C_f	
24.4	22.4					Wind Pressure, P_{asd}, psf = P_{ult} * 0.6	
1.4	0.6					Segment Shear Force, F_{seg}, kips = P_{asd}*$Area_{seg}$	
17.2	2.8					Segment Moment M_{seg} kip*ft = F_{seg}*$Centroid_{seg}$	

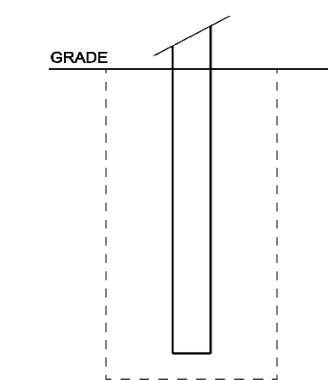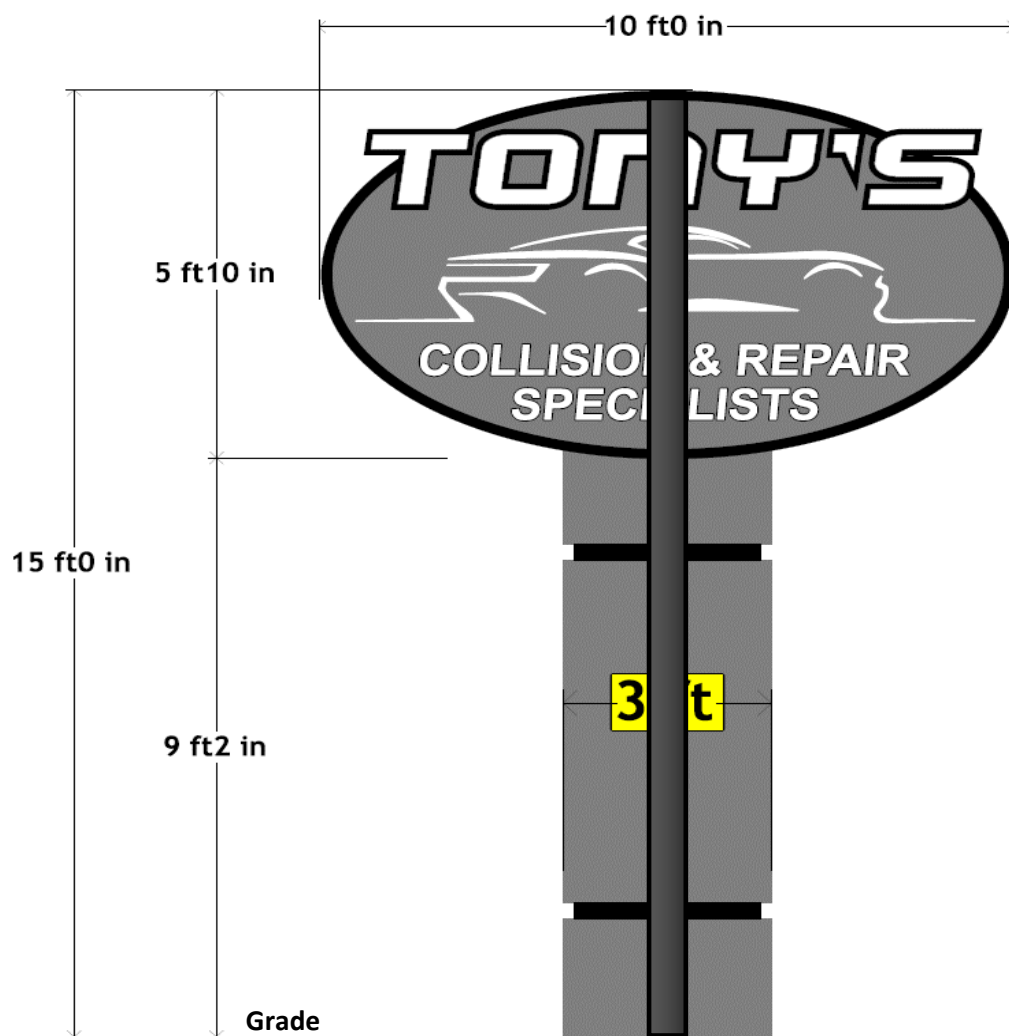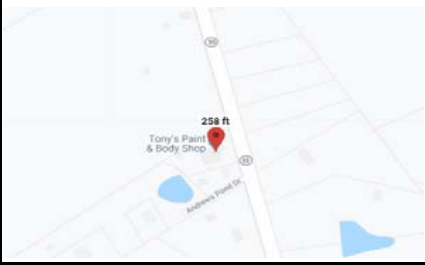|		
"grade" = 0 ft	**2.04 kip**	Total Shear at Grade, V = Sum (F_{seg})
9.82043	**20.0 kip.ft**	Total Moment at Grade, M = Sum(M_{seg})

- Sign manufacturer/installer's design, detailing, fabrication, and erection shall conform to the following specifications: Building Code, ASTM specifications, ACI-318 for reinforced concrete, American Welding Society Code for Welding in Building Construction, AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.
- Materials of construction: (Unless noted otherwise)
  - Structural steel (angles, shapes, plates, gussets): ASTM A-36, Fy = 36 ksi.
  - HSS round steel tubing: A-500, Grade B, Fy=42ksi; Rectangular: 46ksi.
  - Structural aluminum tubing: 6053, 6061-T6, or equivalent, Fy = 18 ksi at weld.
  - Structural pipe: A-53, Grade B, Type E or S, Fy = 35 ksi.
  - Anchor bolts: ASTM F1554 Grade 36 with heavy hex at bottom, not "L or J" bolts.
  - Connection bolts: A-325, snug tight.
  - Rebar: ASTM 615, #6 or larger - Grade 60, #5 or smaller - Grade 40, 3" cover.
  - Concrete: 2500 psi, 28 days.
  - Provide coatings to prevent any possibility of corrosion.
- Welding design and fabrication according to AWS D1.1.
  - AWS certification required for all structural welders.
  - E70XX electrodes for SMAW processes. F7X-EXXX electrodes for SAW processes.
- Embedded column acts as vertical reinforcement for drilled and cube foundations.
- Soil must be verified by sign installer. This design assumes presumptive soil bearing capacity (asd) from code, Table1806.2 (or IBC). Vertical = 1500 psf for Class 5 (clay/silt CL,ML,MH,CH); Lateral = 2*150 psf/ft for Class 4 (sand, silty sand, clayey sand, SW,SP,SM,SC,GM,GC), and Lateral Sliding Coeff = 0.25 for Class 4 soil. Lateral bearing is doubled for sign poles per 1806.3.4. If there is a question about soil bearing do a soil
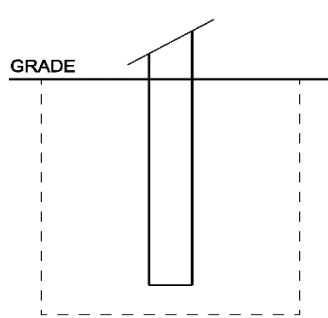
Drilled Shaft Foundation
3' dia x 6.5' deep
or 2.5' dia x 7' deep
or 2' dia x 7.6' deep

Cube Foundation
4.8' cube, L=W=D

Cube	Drilled Shaft Foundation, 6th Ed FBC,1807.3.2.1					
L=W=D	laterally unconstrained at grade					
4.8	3.0	2.5	2.0	Diameter, b, ft	(or length and width of cube)	6.7
4.8	6.5	7.0	7.6	Depth, D, ft	D= 0.5*A{1+[1+(4.36*Hcent/A)]^.5}	
1.5	2.5	2.7	3.1	A term	A = 2.34*F/(S1*b)	
479	649	696	758	S1 or S3	S1 = 2*Ssoil*D/3	
			150		Ssoil psf/ft for Sand (type 4)	

Spread Foundation		
	Q psf for Sand (type 4) = 2000	
7.0	Length, L, ft	10.0
7.0	Width, W, ft	8.0
1.9	Depth, D, ft	6.0
2655	Soil Bearing at Bottom of Fdn, Qbot, psf, Qbot = 1.3*(Q+100pcf*(D-1))	2925
13.6	Total Weight, Wt, kips, Wt = L * W * D * .15 kips/ft3	72.0
1.5	Toe Length, Toe, ft, Toe = Wt / (W * Qbot)	6.2
3.0	Bearing Eccentricity, e, ft, e = L / 2 - Toe / 3	2.9
27.3	Overturning Capacity Calc, OT, kip.ft, OT = Wt / e / 1.5 safety	141.5 20.0

Spread Foundation (Long is perpendicular to face)
7' long x 7' wide x 1.9' deep

#5, 12"OC each way, 2 mats, 3" from top and bot, gentle bend around column

Weld 3' long 2" x 2" x 3/8" angle to bottom and side of column with 3/8" fillet weld all around

All foundations: Embed column to 6" from bottom in 2500 psi or higher concrete

GRADE
Grade offset (ft)

GRADE

Drilled Shaft Foundation

GRADE

Cube Foundation

GRADE

10 ft 0 in
5 ft 10 in
15 ft 0 in
9 ft 2 in
Grade

11/13/2020
This seal for structural engineering
(Foundation & Support Column ONLY)

SCOPE OF WORK: Design sign support column and foundation to meet structural requirements of building code based on stated (not verified) site factors and size & shape based on sign installer's drawing, attached.
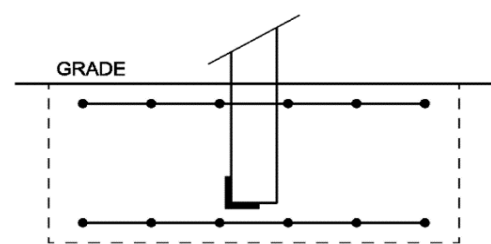
By using this engineering the owner, manufacturer, and installer accept responsibility to: Design, build, and install sign cabinet, face, attachment, electrical, etc according to sign code, building code, and UL. Verify site conditions match stated wind speed, risk, exposure, topo, and soil factors.

Advance Signs & Service, Inc.

JOB 201233

PYLON SIGN
1 Column, Centered,
Embedded in Foundation

Tony's Paint & Body
1487 NC-55
Coats, NC 27521

Valid for one sign at this location.